

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising:
  - a photoconductive medium;
  - a laser scanning unit to scan a laser beam to the photoconductive medium to form an electrostatic latent image thereon;
  - a plurality of developing apparatuses each comprising:
    - a developing roller to adhere a toner to the electrostatic latent image,
    - a supplying roller to supply the toner, and
    - a toner supply part formed between the developing roller and the supplying roller to adhere the toner onto the supplying roller;
  - a transferring unit to transfer a toner image including the adhered toner formed on the photoconductive medium to a paper;
  - a voltage supplying apparatus to supply a bias voltage to the developing rollers and the supplying rollers of the respective developing apparatuses to enable the developing apparatuses to perform respective developing operations; and
  - a controlling apparatus to control the voltage supplying apparatus such that the developing apparatuses perform the developing operations one by one with respect to the respective electrostatic latent images which are formed on the photoconductive

medium.

2. The image forming apparatus of claim 1, wherein the controlling apparatus applies a reverse bias voltage to the supplying roller of the developing apparatus which has finished the respective developing operation such that the toner on the respective developing roller is collected by the respective supplying roller.

3. The image forming apparatus of claim 2, wherein:

the photoconductive medium includes:

an image area wherein the electrostatic latent image is formed, and

a non-image area wherein the electrostatic latent image is not formed,

a developing area is formed between the photoconductive medium and the respective developing roller, so that the toner of the respective developing roller is moved to the photoconductive medium along the developing area; and

the controlling apparatus applies the reverse bias voltage to the respective supplying roller from when the non-image area is opposite the developing area until when the image area is opposite the developing area.

4. The image forming apparatus of claim 3, wherein the controlling apparatus applies a neutral bias voltage to the respective supplying roller, the neutral bias voltage having a same magnitude as the respective bias voltage applied to the developing roller, from when a distance between the non-image area to the developing area and a distance between the respective toner supply part to the developing area are equal until when the non-image area is opposite the developing area.

5. The image forming apparatus of claim 2, wherein the controlling apparatus controls the voltage supplying apparatus to stop supplying the bias voltage to the respective supplying roller after the toner of the respective developing roller is collected.

6. The image forming apparatus of claim 2, wherein a magnitude of the reverse bias voltage is less than or equal to an electric potential where the electrostatic latent image is formed.

7. The image forming apparatus of claim 1, wherein the respective developing apparatuses each have a gap ring rotating in contact with the photoconductive medium to maintain a predetermined gap between the respective

developing roller and the photoconductive medium.

8. A controlling method of a developing unit comprising a photoconductive medium, first to fourth developing apparatuses each comprising a developing roller mounted near the photoconductive medium to adhere toner to an electrostatic latent image formed on the photoconductive medium, a toner supply part, and a supplying roller to supply the toner to the respective developing roller through the toner supply part, the toner supply part being formed between the developing roller and the supplying roller, the controlling method comprising:

adhering the toner of the first developing apparatus to the electrostatic latent image of the photoconductive medium, comprising applying a first bias voltage to cause a potential difference between the first developing roller and the first supplying roller;

collecting the toner of the first developing roller comprising applying a first reverse bias voltage to the first supplying roller;

adhering the toner of the second developing apparatus to the electrostatic latent image of the photoconductive medium by applying a second bias voltage to cause a potential difference between the second developing roller and the second

supplying roller;

collecting the toner of the second developing roller comprising applying a second reverse bias voltage to the second supplying roller;

adhering the toner of the third developing apparatus to the electrostatic latent image of the photoconductive medium, comprising applying a third bias voltage to cause a potential difference between the third developing roller and the third supplying roller;

collecting the toner of the third developing roller comprising applying a third reverse bias voltage to the third supplying roller;

adhering the toner of the fourth developing apparatus to the electrostatic latent image of the photoconductive medium, comprising applying a fourth bias voltage to cause a potential difference between the fourth developing roller and the fourth supplying roller; and

collecting the toner of the fourth developing roller comprising applying a fourth reverse bias voltage to the fourth supplying roller.

9. The controlling method of claim 8, wherein the photoconductive medium includes an image area whereon the electrostatic latent image is formed, and a non-

image area whereon the electrostatic latent image is not formed, and a developing area between the photoconductive medium and the respective developing roller, so that the toner of the respective developing roller is moved to the photoconductive medium along the developing area, the method further comprising:

applying the respective reverse bias voltage to the supplying roller from when the non-image area is opposite the developing area until when the image area is opposite the developing area.

10. The controlling method of claim 9, further comprising applying a neutral bias voltage to the supplying roller, the neutral bias voltage having a same magnitude as the bias voltage applied to the respective developing roller, from when a distance from the non-image area to the developing area and a distance from the respective toner supply part to the developing area become equal until when the non-image area is opposite the developing area.

11. The controlling method of claim 8, further comprising discontinuing the respective voltages applied to the developing rollers and supplying rollers, after the collecting of the respective toners.

12. The controlling method of claim 8, wherein a magnitude of the reverse bias voltages is less than, or equal to a potential where the electrostatic latent image is formed.

13. The controlling method of claim 9, wherein the applying of the respective bias voltage begins when a distance from the image area to the developing area and a distance from the respective toner supply part to the developing area are equal.

14. An apparatus comprising:  
a photoconductive medium to form electrostatic latent images thereon;  
first and second developers, each comprising:  
a developing roller to receive color toner and transfer the received color toner to the respective electrostatic latent image,  
a supplying roller to supply the toner to the developing roller, and  
a toner supply part formed between the developing roller and the supplying roller to adhere the toner onto the developing roller;  
a voltage supplier to supply a bias voltage to the developing rollers and the

supplying rollers of the respective developers to enable the developers to perform respective developing operations, and

a controller to control the voltage supplier such that the developers perform the developing operations one by one with respect to the respective electrostatic latent images which are formed on the photoconductive medium.

15. The image forming apparatus of claim 14, wherein the controller applies a reverse bias voltage to the supplying roller of the developer which has finished the respective developing operation such that the toner on the respective developing roller is collected by the respective supplying roller.

16. A method comprising:

forming an electrostatic latent image on a photoconductive medium;  
applying a voltage to a first developing roller while a second developing roller receives no voltage, to attach a first color developer to the first developing roller and not the second developer;  
transferring the attached developer to the electrostatic latent image; and  
applying a neutral bias voltage to a supplying roller adjacent to the first

developing roller to stop the attaching of the first color developer to the first developing roller.

17. The method of claim 16, wherein the transferring of the attached developer comprises transferring the developer when the electrostatic latent image approaches a developing area of the first developing roller, the developing area being between the first developing roller and the photoconductive medium.

18. The method of claim 17, wherein the photoconductive medium comprises an image area and a non-image area, and the forming of the electrostatic image comprises forming the electrostatic image on the image area.

19. The method of claim 18, further comprising:  
applying a supply voltage to the supplying roller to thereby supply the toner to the first developing roller via a toner supply part formed between the supplying roller and the first developing roller, before a length of a first section becomes the same as a length of a second section, the first section extending from the non-image area of the photoconductive medium to the developing area, and the second section extending

from the toner supply part to the developing area.

20. The apparatus of claim 2, wherein the toner is collected during the developing operation of the next developing apparatus.

21. The apparatus of claim 2, wherein the developing operation of the next developing apparatus begins immediately after the toner is collected.

22. An apparatus comprising:

a photoconductive medium to form electrostatic latent images thereon;

first and second developers, each comprising:

    a developing roller to receive color toner and transfer the received color toner to the respective electrostatic latent image,

    a supplying roller to supply the toner to the developing roller, and

    a toner supply part formed between the developing roller and the supplying roller to adhere the toner onto the developing roller; and

    a voltage supplier to sequentially supply a bias voltage to the developing roller and the respective supplying roller performing a developing operation, the developer

not performing the developing operation not receiving the bias voltage.